Test Report issued under the responsibility of:

TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Report Number. ..... :	**AI19-0046708-01**
Date of issue..... :	**2020, 29th January**
Total number of pages ..... :	**9**
Name of Testing Laboratory preparing the Report ..... :	**IMQ S.p.A. – Milano** – Via Quintiliano, 43 – 20138 Milano – Italy
Applicant's name ..... :	**GOCCIA ILLUMINAZIONE s.r.l.**
Address..... :	via E. Fermi, 59-65 – 25020 Poncarale (BS) - Italy
Test specification:	
Standard ..... :	IEC TR 62778:2014 (Second Edition)
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62778A
Test Report Form(s) Originator .... :	TÜV SÜD Product Service GmbH
Master TRF ..... :	Dated 2016-02

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General disclaimer:

The test results presented in this report relate only to the object tested.
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Additional IMQ remarks
This report covers recommended practices for classification, labelling and informational requirements for devices that emit optical radiation and related only to the Blue Light Hazard. Irradiance and radiance measurements have been performed in compliance with the methods described in IEC 62471:2006 (or EN 62471: 2008). The Blue Light Hazard Radiance and Irradiance have been calculated by weighting the energy emitted by the source in the wavelength range between 300 nm and 700 nm with the Blue Light Function B(λ). The measurements have been performed in a dark room and in that position of the beam giving the maximum reading. Tests and check results, written here, refers only to tested object that are described in this report. Only full reproductions of this Test Report are allowed without written authorization of IMQ. Throughout this report a coma is used as the decimal separator. Internal procedures used for type testing through which traceability of the measuring uncertainty has been established: - General Procedure PG-037 – Calibration process of test and measurement equipment - Operational Instruction IO-LAB-001 – Estimation of Measurement Uncertainty of Tests in the IMQ Testing Laboratory - Operational Instruction IO-LAB-004 – Definition of the uncertainty limits of the measuring instruments used in the IMQ Testing Laboratory - Operational Instruction IO-04-G01 Procedures and Operational Instructions are to be assumed in the current version at the time of the TR issue. The uncertainties evaluation has been carried out in accordance with IEC Guide 115 "Application of Uncertainty of measurement's to Conformity Assessment Activity in the Electro-technical sector" and IECEE OD5014. The ability or reliability of the product to perform its intended function in a particular application has not been investigated. Unless otherwise specified, warnings, installation instruction and/or user manual provided with the sample have been checked in Italian or English version only. IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.

Test item description ..... :	LED luminaires	
Trade Mark ..... :	**GOCCIA ILLUMINAZIONE**	
Manufacturer ..... :	**GOCCIA ILLUMINAZIONE s.r.l.** via E. Fermi, 59-65 – 25020 Poncarale (BS) - Italy	
Model/Type reference ..... :	type 54404K, series QUANTUM	
Ratings ..... :	with LED module at 9 V dc – 350 mA dc	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ **CB Testing Laboratory:**		
Testing location/ address.....:	**IMQ S.p.A. - Milano** - Via Quintiliano 43, 20138 – Milano - Italy	
☐ **Associated CB Testing Laboratory:**	N/A	
Testing location/ address.....:	N/A	
Tested by (name, function, signature).....:	Paola Giannetta *(Laboratory technician)*	Paola Giannetta cosign
Approved by (name, function, signature)...:	Simone Bilotta *(Laboratory manager)*	Simone Bilotta cosign
☐ **Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address.....:	N/A	
Tested by (name, function, signature).....:	N/A	
Approved by (name, function, signature)...:	N/A	
☐ **Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address.....:	N/A	
Tested by (name + signature) .....:	N/A	
Witnessed by (name, function, signature) .:	N/A	
Approved by (name, function, signature)...:	N/A	
☐ **Testing procedure: CTF Stage 3:**	N/A	
☐ **Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address.....:	N/A	
Tested by (name, function, signature).....:	N/A	
Witnessed by (name, function, signature) .:	N/A	
Approved by (name, function, signature)...:	N/A	
Supervised by (name, function, signature) :	N/A	

List of Attachments (including a total number of pages in each attachment): -	
Summary of testing:	
Tests performed (name of test and test clause): **7.1 - 7.2 – 7.3 – 7.4 – 8**	**Testing location:** **IMQ S.p.A. – Milano** - Via Quintiliano 43, 20138 - Milano - Italy
Summary of compliance with National Differences (List of countries addressed): ☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)**	

Copy of marking plate: N/A

Test item particulars.....:	
Product evaluated.....:	☐ **LED package** ☒ **LED module** ☐ **Lamp** ☒ **Luminaire**
Rated voltage (V) .....:	LED module (both stand alone and belonging to luminaires) at 9 V dc
Rated current (mA) .....:	LED module (both stand alone and belonging to luminaires) at 350 mA dc
Rated CCT (K).....:	4000 K rated
Rated Luminance (Mcd/m^2) .....:	-
Component report data used .....:	☒ **Not applicable** ☐ **LED package** ☐ **LED module** ☐ **Lamp** Report number: -
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2019, 16th December (BEM 98194) ; items *sampled and sent by applicant.*
Date (s) of performance of tests.....:	2020, from 24th to 28th January
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☒ comma / ☐ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	

Name and address of factory (ies) ..... :	**GOCCIA ILLUMINAZIONE s.r.l.** via E. Fermi, 59-65 – 25020 Poncarale (BS) - Italy
General product information: White LED luminaires. See also Product Composition for more details.	

Product composition
series QUANTUM: types 54404K, 54403K

Component	Quantity	Manufacturer	Model	Technical data and ratings
LED module\PCB	1	Qualitron	Cod.A40LINE5700B	51 LED packages
LED packages	51	LUMILEDS	LUXEON 3014	4000K (54404K) 3000K (54403K)
External covering	1	Satin opaque plastic , mounting to obtained symmetric light emission		
heatsink	1	aluminium		

Drawings, schematics and layouts available on request directly from applicant.

series QUANTUM: types 54354K, 54353K

Component	Quantity	Manufacturer	Model	Technical data and ratings
LED module\PCB	1	Qualitron	Cod.A40LINE5700B	51 LED packages
LED packages	51	LUMILEDS	LUXEON 3014	4000 K (54354K) 3000 K (54353K)
External covering	1	Satin opaque plastic , mounting to obtained a-symmetric light emission		
heatsink	1	aluminium		

Drawings, schematics and layouts available on request directly from applicant.

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		P
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		N/A
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied	When necessary 4.2.2 and 4.3.3 of IEC62471:2006	P
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		**N/A**
	LED package is evaluated as ..... :	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		-
	- .. Risk Group 0	at 20cm on luminaires with diffusing covering	P
	- .. Risk Group 1 (unlimited)	at 20cm on LED package\module	P
	- E_{thr} ..... (lx) : Distance to reach RG1 ..... (m) :		N/A

	TABLE : Spectroradiometric measurement		P
	Measurement performed on:	☐ **LED package** ☒ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model number..... …:	series QUANTUM type 54404K	
	Test voltage (V) .....:	(*) (**) with LED module at 9 V dc – 350 mA dc	—
	Test current (mA) .....:		—
	Test frequency (Hz).....:	-	—
	Ambient, t (°C) .....:	23 +/- 2 °C	—
	Measurement distance.....:	☒ 20 cm ☐ ... cm	—
	Source size .....:	☒ Non-small ☐ Small : mm	—
	Field of view .....:	☒ 100 mrad ☒ 11 mrad ☒ 1,7 mrad	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	4000 K	Indicative measurements
x/y colour coordinates			/	-
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	1,7 mrad; 20 cm: 6800	(*)
			1,7 mrad, 20 cm: 1600 11 mrad, 20 cm: 240 100 mrad; 20 cm: 45	(**)
Blue light hazard irradiance	E_B	W/m^2	N/A	-
Luminance	L	cd/m^2	N/A	-
Illuminance	E	lx	N/A	-

Supplementary information:

(*) tests executed directly on 4000 K LED module belonging to luminaires and powered at 350 mA dc

(**) tests executed on luminaires provided with diffusing covering and with LED module powered at 350 mA dc.

Classification of luminaire (with diffusing covering): RG0 (this classification is correspondent to Exempt or '0' Group in accordance with IEC 62471:2006, EN 62471:2008, CEI EN 62471:2010).

Tests executed on series QUANTUM type 54404K, results obtained and risk group classification can be extended to series QUANTUM types: 54403K, 54354K, 54353K.

	TABLE: Angular light distribution	N/A
-		

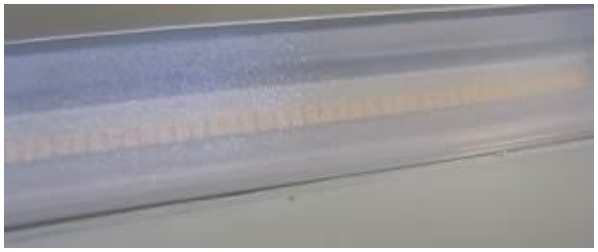
Test equipment list 7.1 - 7.2 – 7.3 – 7.4 – 8. λ: 300 - 800 nm; T: (0 ÷ +70) °C; UR: (0 ÷ 100) % UR					
Instrument	**Manufacturer**	**Model**	**IMQ Ref.**	**Last calibration date**	**Calibration due date**
Double monochromator	Bentham Instruments	IDR300	S04971	N/A	
Photomultiplier tube		DH-3	S04972	N/A	
Silicon detector		DH-SI	S04974	N/A	
Infrared detector		DH-InGaAs-3-LENS	S04973	N/A	
Diffuser		D7	S05069	N/A	
Telescope		TEL309	S05016	N/A	
Radiance standard lamp		SRS12	S04979	02-2019	02-2020
Irradiance standard lamp		CL6	S04980	02-2019	02-2020
Laser meter	Leyca Geosystems	DISTO D3	S05070	12-2019	12-2020
hygrometer	Delta ohm	HD35EDL1NTV.E	S08228	10-2019	10-2020
DC power supply	Chroma	62012P-600-8	P03157	N/A	
Digital multimeter	Fluke	289	S04951	04-2019	04-2020

The measurement instruments are adequate calibrated. All the calibration certificates are kept internally in IMQ S.p.A.

Evaluation of uncertainty	
Measure	**Expanded Uncertainty**
Blue Light Risk Radiance	7,6 %
Luminance	-
Distance	-

The measurements uncertainties stated in this document have been determined according to the ISO/IEC Guide 98 and to EA-4/16. Usually, they have been estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95 %. Normally, this factor k is 2.

PHOTOGRAPHIC DOCUMENTATION



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